

## CLAIMS

1. An LED mounting module, comprising:

a substrate; and

5 a reflecting member made of a resin material and having  
a reflecting hole in a position corresponding to an LED device  
which is to be mounted on one of main surfaces of the substrate,  
wherein

the substrate and the reflecting member are directly  
10 adhered to each other in such a state that the main surface  
of the substrate is in contact with one of main surfaces of  
the reflecting member.

2. The LED mounting module of Claim 1, wherein

15 the substrate includes an insulation board made of a resin  
material, and a wiring pattern on one of main surfaces of the  
insulation board, and

the resin material forming the insulation board contains  
a same resin as the resin material forming the reflecting member.

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3. The LED mounting module of Claim 1, wherein

the resin material is a thermosetting resin material

principally containing an epoxy resin.

4. The LED mounting module of Claim 1, wherein

the resin material is a thermoplastic resin material  
5 principally containing a resin selected from a group consisting  
of a polyphthalamide resin, a liquid crystal polymer, a  
polyphenylene sulfide resin, and a polybutylene terephthalate  
resin.

10 5. The LED mounting module of Claim 1, wherein

the resin material contains one or more fillers to improve  
reflection efficiency.

6. The LED mounting module of Claim 5, wherein

15 the fillers include at least one of  $\text{TiO}_2$ ,  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ , and  
 $\text{BaSO}_4$ .

7. The LED mounting module of Claim 2, wherein

the resin material forming the insulation board contains  
20 at least one of  $\text{Al}_2\text{O}_3$ ,  $\text{AlN}$ ,  $\text{SiO}_2$ , and  $\text{SiC}$ .

8. The LED mounting module of Claim 2, wherein

a metal board is provided on the other main surface of the substrate, and

the resin material forming the insulation board is a composite material containing an inorganic filler and a thermosetting resin material.

9. The LED mounting module of Claim 2, wherein

a metal board is provided on the other main surface of the substrate, and

10 the resin material forming the insulation board is a thermosetting resin material containing a glass fiber.

10. The LED mounting module of Claim 1, wherein

a depression is formed in a part of the substrate at which the reflecting member is adhered, and

the depression is filled with the resin material forming the reflecting member.

11. The LED mounting module of Claim 1, wherein

20 the LED device is one of a plurality of LED devices that are to be mounted on the main surface of the substrate, and the reflecting hole is one of a plurality of reflecting

holes formed in the reflecting member in correspondence with the plurality of LED devices.

12. The LED mounting module of Claim 1, wherein

5       the substrate includes an insulation board made of a ceramic material, and a wiring pattern on one of main surfaces of the insulation board.

13. The LED mounting module of Claim 12, wherein

10       the ceramic material contains at least one of  $\text{Al}_2\text{O}_3$ ,  $\text{AlN}$ ,  $\text{SiO}_2$ , and  $\text{SiC}$ .

14. An LED module comprising:

15       the LED mounting module defined in Claim 1; and  
      an LED device mounted on the LED mounting module.

15. A manufacturing method of an LED mounting module including a substrate and a reflecting member having a reflecting hole in a position corresponding to an LED device which is to be  
20   mounted on one of main surfaces of the substrate, the manufacturing method comprising:

      a formation step of forming a half-cured reflecting member

formed by a resin material in B stage; and

a connection step of placing the half-cured reflecting member on the main surface of the substrate, and completely curing the resin material in B stage while the main surface of the substrate is in contact with a main surface of the half-cured reflecting member which faces the substrate, thereby forming the reflecting member, which is directly adhered to the substrate.

10 16. The manufacturing method of Claim 15, wherein

the reflecting member is made of a thermosetting resin material, and

in the connection step, the substrate and the half-cured reflecting member are heated and applied with pressure while the main surface of the substrate is in contact with the main surface of the half-cured reflecting member.

17. A manufacturing method of an LED module, comprising:

a manufacturing step of manufacturing an LED mounting module, based on the manufacturing method defined in Claim 15;

a mounting step of mounting the LED device at a predetermined location on the manufactured LED mounting module;

and

a covering step of covering the mounted LED device with a resin material containing a phosphor powder.

5 18. A manufacturing method of an LED mounting module, comprising:

a substrate formation step of forming a substrate; and

a reflecting member formation step of forming a reflecting member on one of main surfaces of the substrate, the reflecting member being made of a resin material and having a through hole  
10 in a position corresponding to an LED device which is to be mounted on the main surface of the substrate, wherein

in the reflecting member formation step, the reflecting member is formed in such a manner that a molding member is placed on the main surface of the substrate, a liquid resin material  
15 is injected into a space defined between the molding member and the substrate, and the resin material in the space is cured.

19. The manufacturing method of Claim 18, wherein

a wiring pattern is formed on the main surface of the  
20 substrate,

the molding member is formed like a box, and has a protrusion formed on a base in a position corresponding to the LED device

which is to be mounted on the main surface of the substrate,

when the molding member is placed on the substrate, a top part of the protrusion faces toward the wiring pattern,

a depression is formed in correspondence with the wiring  
5 pattern, in the top part of the protrusion,

a width of the depression is larger than a width of the wiring pattern, by 1  $\mu\text{m}$  to 20  $\mu\text{m}$ , and

a portion of the depression, which corresponds to a portion of the wiring pattern on which the LED device is to be mounted,  
10 has a depth larger than a thickness of the wiring pattern.

20. The manufacturing method of Claim 18, wherein

the liquid resin material is injected under reduced pressure.

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21. The manufacturing method of Claim 18, wherein

in the reflecting member formation step, after the resin material in the space is cured, a surface of the cured resin material which faces away from the substrate is flattened.

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22. The manufacturing method of Claim 18, wherein

in the reflecting member formation step, after the resin

material in the space is cured, flash is removed by spraying particles against the flash.

23. A manufacturing method of an LED module, comprising:

5       a mounting step of mounting an LED device on one of main surfaces of a substrate; and

          a reflecting member formation step of forming a reflecting member on the main surface of the substrate on which the LED device has been mounted, the reflecting member being made of  
10   a resin material and having a through hole in a position corresponding to the LED device, wherein

          in the reflecting member formation step, the reflecting member is formed in such a manner that a molding member is placed on the main surface of the substrate, a liquid resin material  
15   is injected into a space defined between the molding member and the substrate, and the resin material in the space is cured.

24. The manufacturing method of Claim 23, wherein

          a wiring pattern is formed on the main surface of the  
20   substrate,

          the molding member is formed like a box, and has a protrusion formed on a base in a position corresponding to the LED device



mounted on the main surface of the substrate,

when the molding member is placed on the substrate, a top part of the protrusion faces toward the wiring pattern,

a depression corresponding to the wiring pattern and a  
5 depression corresponding to the LED device are formed in the top part of the protrusion, and

a width of the depression corresponding to the wiring pattern is larger than a width of the wiring pattern, by 1  $\mu\text{m}$  to 20  $\mu\text{m}$ .

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25. The manufacturing method of Claim 23, wherein

the liquid resin material is injected under reduced pressure.

15 26. The manufacturing method of Claim 23, wherein

in the reflecting member formation step, after the resin material in the space is cured, a surface of the cured resin material which faces away from the substrate is flattened.

20 27. The manufacturing method of Claim 23, wherein

in the reflecting member formation step, after the resin material in the space is cured, flash is removed by spraying

particles against the flash.